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STANDARD OPERATION PROCEDURES

8-Foot Transonic Pressure Tunnel - Building 64D

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Langley 8-Foot Transonic Pressure Tunnel

The Langley 8-Foot Transonic Pressure Tunnel is located on Wind-Tunnel Road, Building 640, in the East Area. The tunnel has certain precautionary measures which must be observed for safe operation since it is a closed circuit tunnel and has the capability to change the stagnation pressure from 1/10 atm to 2.0 atms. In addition, nitrogen gas is sometimes used whenever model tests require pressure to simulate thrust. Certain valves must be opened or closed to purge the tunnel circuit before personnel may be permitted to enter the test section. New personnel shall be thoroughly indoctrinated in potentially hazardous areas and in safe working practices before starting work. All personnel shall report unsafe conditions to his supervisor. Suggestions for improving safety are encouraged.

Safety Precautions

High pressure storage field.- High pressure gaseous nitrogen is available for use in the Langley 8-Foot Transonic Pressure Tunnel and 2-Foot Hypersonic Facility. The high pressure system consists of a liquid nitrogen DEWAR tank, a pumping station, a high pressure tank storage farm, and suitable high pressure distribution lines. The liquid nitrogen pumping system is designed to have safety valves located in all major elements of the system to prevent over-pressurization. During nitrogen pumping operation, all personnel shall wear protective clothing and gloves to prevent liquid nitrogen from coming in contact with skin. A protective booth is also located at the pumping station where safety equipment is also stored.

Tunnel stagnation pressure control.- The stagnation pressure in the Langley 8-foot transonic pressure tunnel can be varied from $1/10$ -atm. to 2.0 atms. The stagnation pressure is controlled with the use of a 10,000 c.f.m. compressor which is used to vary the pressure from $1/4$ -atm. to 2.0 atms. and with the use of a 100,000 c.f.m. compressor in series with the 10,000 c.f.m. compressor when stagnation pressures less than $1/4$ -atm are desired. Safety valves are conveniently located in the tunnel circuit to prevent over-pressurization above 2.0 atms. The 10,000 c.f.m. compressor which is used to reduce the tunnel stagnation pressure to $1/4$ -atm. has guide vanes which will automatically close at 450 p.s.f. thus making the compressor inoperable.

Precautionary measures to observe when securing tunnel prior to run.- Before tunnel doors and hatches are closed, all working tools, mats, portable lights, and the like shall be removed from the test section. A check shall be made to determine that all personnel are out of the tunnel circuit before the external doors of the pressure vessel are closed and secured with a lock. In the event that personnel were locked inadvertently in the test chamber, an alarm bell located in the control room of the tunnel can be activated with an emergency switch which is located in the test chamber. The emergency switch is also locked in with the 10,000 c.f.m. compressor and activation of this switch will shut-down the compressor.

Precautionary measures to observe before entering tunnel.- Before entry can be made to the tunnel, the tunnel stagnation pressure must

be brought to atmospheric pressure. Before work is to be done on the model, mats are to be placed in the tunnel to prevent personnel from stepping through slots which are located in the tunnel floor.

Other Precautions.- (1) All floor access hatches located on second and third floors shall have barricades erected when open to prevent personnel from falling through. (2) Chain barricades shall be in place when lowering or raising test section elevator. (3) Before starting tunnel, a check sheet with 91 items to be checked off shall be filled out, checked, and signed by shift leader. (Check sheet enclosed)

Safe Shop Practices

Refer to NASA safety pamphlets with regard to use of band saws, drill presses, grinding wheels, lathers, etc. However, a few reminders are in order in safe shop practices.

Safe shop practices.- (a) Only authorized personnel shall use acetylene welding equipment. No oil shall be used on any oxygen fittings or connection. (b) Safety glasses shall be worn during all sawing, drilling, grinding, chipping, filing, etc. Safety glasses are available in areas where danger from flying objects exist. (c) Observe warning signs indicating dangerous materials or areas. (d) Chisels which have become mushroomed shall be ground smooth before use. (e) All electrical tools shall be properly grounded before use. (f) Make sure all protective guards are in proper place on machinery and tools. (g) Clean chips from surface with brush instead of hands. (h) Keep floor and equipment clean around rotating machinery.

Red "Hold Off" Tags

Whenever the possibility of harm to machinery or injury to workmen exists, red tags shall be used to hold-off rotating machinery, electrical switches, pressure valves, and other control devices.

8' TPT CHECK LIST

Preparation for Run _____

Date _____

Lubrication House:

Time of check _____

No. 3 water pump "on"
 Main power switches "on"
 Oil heater
 Oil level of main tank
 Jack pump
 Vacuum pump
 Shaft seal switches "A" and "B"
 Control switches "1" and "2"
 Main oil pump
 Emergency pump
 Vacuum pump lubricator operating properly
 Turn manual operation switch "on"
 Hand-off-auto switches
 Vacuum pump on "auto"
 Shaft seal "A" on "auto"
 Shaft seal "B" on "auto"
 Jack pump "on"
 L. P. bearing pressure
 H. P. bearing pressure
 Main bearing oil pressure
 Check operation of emergency oil pump
 Oil flow to thrust bearing
 Oil flow to shaft bearing

OBSERVER _____
 KEY RETURNED _____

Control Center No. 2:

Time of check _____

No. 3 water pump
 Time turned "on"
 Suction pressure
 Discharge pressure
 Time turned "off"
 Header checked for air
 No. 1 water pump
 Time turned "on"
 Suction pressure
 Discharge pressure
 Time turned "off"
 No. 2 water pump
 Time turned "on"
 Suction pressure
 Discharge pressure
 Time turned "off"
 CWT water pump pressure

Cooling Tower Fans:

Light on fan 1	Red _____	Green _____
Light on fan 2	Red _____	Green _____
Light on fan 3	Red _____	Green _____

Control Center No. 1 Time of check _____

Lighting breaker "on" and lighting switches 1-8 "on" _____

No. 3 water pump "on" _____

Refrigeration compressors

No. 1 breaker "on" with hand-off-auto switch on auto _____

No. 2 breaker "on" with hand-off-auto switch on auto _____

Seal air compressor on "run" and "auto" with breaker "on" _____

10,000 CFM compressor

Aux. oil pump on auto with run light (red) on _____

Compressor cooling water pump on and run light "on" _____

Inlet guide vanes closed and on manual _____

Butterfly valve No. 12 open _____

Aftercooler inlet water pressure _____

Compressor cooling water pressure _____

Compressor oil pressure _____

Compressor started and time entered in log _____

Pressure ratio valve controller on "auto" _____

Inlet guide vanes on "auto" _____

Compressor motor current _____

3,000 CFM compressor

Proper butterfly valves and hand valves open _____

Aux. oil pump on auto with run light "on" _____

Compressor oil pressure _____

Pressure ratio valve controller on "auto" _____

Compressor started and time entered in log _____

Motor current _____

Control Center No. 4 Time of check _____

Tunnel temperature Brown "on" and standardized _____

Tunnel temperature controller on "auto" _____

Tunnel cooling water Brown "on" and standardized _____

Tunnel cooling water controller on "auto" _____

Cooling water low pressure lights off _____

Proper pressure ratio controller on "auto" _____

Supply air pressure to instruments _____

All indicating lights on panel 4 burning properly _____

Ideal manometer balanced and connected to tunnel _____

Stroboconn on and warmed up _____

Dewpoint recorder operating properly _____

Tunnel dew point _____

M1 Motor Room

Motor checked for debris and tools lying around and found to be OK _____

Jack pump breaker switch on _____

Jacking gear disengaged _____

Main Tunnel Circuit and Test Chamber

Tunnel circuit checked for cleanliness _____

All hatches secured _____

All personnel out of tunnel and test chamber door secured _____

Date _____ Signed _____
(Shift leader)

20010
20010
20010

20010
20010
20010

^a Whitcomb	^b Gould	^b McIntosh <i>W.P.</i>
^a Ayers	^b Griffith <i>H.J.L.</i>	^a Patterson <i>J.P.</i>
^a Bartlett	^a Harris	^b Perry <i>SEP</i>
^a Bielat <i>M.K.</i>	^b Johnson, Allen <i>W.D.</i>	^b Phaup <i>W.P.</i>
^a Blackwell <i>G.A.B.</i>	^b Johnson, Ben	^a Pierpont
^a Brooks	^a Kelly	^b Price <i>W.P.</i>
^b Deans <i>E.H.</i>	^a Langhans <i>R.A.</i>	^a Samuels <i>R.D.B.</i>
^a Derby <i>J.P.D.</i>	^a Lindsey	^b Smith <i>A.</i>
^b Derby <i>R.D.</i>	^a Luoma <i>A.A.L.</i>	^b Westcott <i>Low</i>
^a Ferris	^a Martin <i>J.M.</i>	^a Woodward <i>R.W.</i>
^a Flechner <i>L.B.F.</i>	^a McGhee	^c Clarke
^c Covington <i>E.W.C.</i>	^c Stone	

^a Engineers
^b Mechanics
^c Electrical boys
^d Technician